

Open source integration for IOT in naval industry - OSI4IOT platform

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ABSTRACT

The development of digital twins has revolutionized the field of engineering by allowing for real-time monitoring and predictive analysis of physical systems. A digital twin is a virtual replica of a physical system that can be used for simulation, analysis, and optimization. In this paper, we present a digital twin platform that integrates various components to enable the development of predictive models based on deep learning.

The platform consists of several components, including Mosquitto for data transfer, node-red as the main programming language, TensorFlow as the API for developing deep learning models, a database for data storage, and Grafana for graphical representation of results. These components work together to provide a real-time 3D visualization of the physical system, which can be used to monitor and analyze the system's behavior. This visualization allows for a better understanding of the system's behavior and its interactions with the environment, which is crucial for effective decision-making.

The work to be presented has included the evaluation and development of a methodology to generate digital twins based on deep learning algorithms and its integration with real-time monitoring. These models use historical and/or synthetic data to predict future behavior and help to optimize processes, leading to improved efficiency and productivity. The OSI4OIT platform also provides tools for analyzing the results of the models and visualizing the results in real-time, allowing for quick and informed decision-making.

In conclusion, the digital twin platform presented represents a significant advancement in the field of engineering, as it allows for real-time monitoring and prediction of physical systems, leading to improved efficiency and productivity. The platform is flexible and scalable, making it suitable for a wide range of applications and industries, including manufacturing, energy, transportation, and many others. By integrating deep learning algorithms, the digital twin provides a powerful tool for optimizing processes and improving decision-making. The platform's real-time visualization and predictive capabilities make it an invaluable tool for engineers and decision-makers looking to improve the performance of their physical systems.

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